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Managing Sparganothis Fruitworm - 2013

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MANAGING SPARGANOTHIS FRUITWORM -- 2013

Sparganothis sulfureana

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Resistance to organophosphate insecticides (e.g. Lorsban) is common in MA populations but alternatives such as spinosyn-based compounds (e.g. Delegate), insect growth regulators (**IGRs** e.g. Intrepid) and new Diamide chemistries (e.g. Altacor) are effective alternatives.

Heads up! Growers who want to best manage Sparganothis must begin sweeping in May to determine when caterpillars are present. Detection of the tiny larvae requires practice. Applications of new compounds need to be applied while caterpillars are still small. However, the payoff is that the new compounds conserve the abundant natural enemies of Sparganothis, parasitic wasps and flies that seek out and attack the larvae.

BIOLOGY

There are two generations per year. First, overwintering tiny larvae that begin feeding in spring, and second, a summer population of larvae that occurs at fruit set.

Spring generation: In the spring, the tiny caterpillars become active and feed on new growth, often webbing themselves between two leaves, forming a sandwich. As they grow, they web together more leaves, eventually drawing together adjacent uprights. When fully grown (Figure 1), the larva forms a silken retreat to pupate.

Summer generation: Following pupation, the adult moths fly in late June and early July. New egg masses hatch within 9-12 days and caterpillars of the summer generation will complete development in about 30-40 days. Caterpillars typically web together uprights and berries and feed in a concealed manner on the underside of berries often gouging the berry surface (Figure 5). If berries are large when caterpillars first hatch, they often enter a berry and feed inside, similar to cranberry fruitworm. Following pupation, the adult moths fly in mid-August into September. New egg masses hatch and the tiny caterpillars overwinter.

Figure 1. The full-grown larva is 10-15 mm long and wriggles fiercely when disturbed.

Figure 2. Feeding injury of summer larvae when they move inside fruit. Larva shown in left berry and in right bottom berry, a pupa has formed inside the fruit. Photo: University WI

GENERAL MANAGEMENT

With both generations, treatments should target the small caterpillars. The spring generation is monitored mainly via sweep netting for larvae and for the experienced scout, by visual inspection. The summer generation is monitored as moths by pheromone traps.

Spring generation: For first generation, sample larvae through sweep-net sampling starting in mid-May. Because of their webbing behavior, caterpillars are picked up in only small numbers and training the eye to look for webbed uprights is important. See Figure 4 for an aid: use a weed (loosestrife) to easily find larvae and get a mind-set of larval appearance when you are searching the sweep net contents. Effective suppression with growth regulators can be maximized by targeting this first generation and acting right after you detect larvae. A second application is

often required. Remember that it takes awhile for the caterpillars to die, so inspect larvae carefully to determine if they are sick soon after the spray and look for dead caterpillars after about a week.

Summer generation: Summer infestations are much more difficult to control, especially once the caterpillars are webbed up or often feeding inside the berry. If managing the second generation, pheromone traps should be utilized to monitor moth flight. Traps must be deployed in the first week of June and moths counted and recorded. Treatment with Intrepid or Altacor should be ca. 3 weeks after *ONSET (biofix)* of moth capture (several moths caught in a trap overnight). This requires that traps are checked daily after they are set out until biofix is observed. Caterpillars are most susceptible right at hatch, so with these compounds, the timing of the spray is accelerated. It is usually early July. On the other hand, Delegate can be used similar to conventional pesticides (e.g. Lorsban) and applied 10-14 days after *PEAK* flight. Here, traps can be checked less frequently, even weekly.

Figure 3. The distinctive sulfur-yellow moth with a brown "X" across wings at rest. About 7-8 mm long. Male moth flight is monitored with pheromone traps for summer management.

Cultivar differences: For Ben Lears, Stevens, and new hybrids, compared to other cultivars, we see faster caterpillar development and higher populations on these earlier and larger berries. Larvae tend to enter the fruit early on, protecting them and making infestation hard to detect and manage.

Late water is <u>not</u> an effective control, except to enhance synchronization of the larval population in the spring.

Figure 4. A tip of the common weed, loosestrife, that has been webbed by a larva. In an infested bed, it is easy to spot these. The stealthy larvae wriggle out unnoticed once disturbed, so open the retreat with this in mind.

Figure 5. Larval feeding may appear as gouging and ragged shot-hole injury to fruit later in season

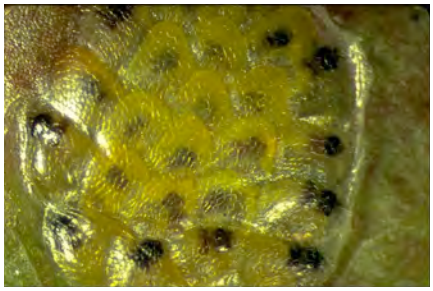

Figure 6. Egg mass just prior to hatch shows black head capsules of first instar larvae. Later larvae have yellowish head capsules.

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Successful management of Sparganothis fruitworm using Delegate, Intrepid and Altacor requires that one monitors extensively. Spring sweep net sampling must be done early and intensively to target the smallest larvae. Tight systems and short-timed chemigations are a must in order to have these compounds work.

6 minute or better rinse times are necessary for these newer chemistries to be effective.
8 minutes or better rinse times may work but not as effectively.

For a moderate to heavy population of Sparganothis larvae in the spring, a tag-team approach could be used – an early Intrepid or Altacor application first, followed by Delegate within 7-10 days if indicated from sweeping results. Because Sparganothis is so hard to pick up in the sweep net when larvae are small, the threshold for action in spring is very low, when averaged across all sweep sets, only 1-2 larvae/sweep set.

Intrepid, Altacor and Delegate can be used in a management program to suppress populations. It may take not only several applications, but also, in the case of Confirm, or in cases of high populations or where only low levels of infestation are tolerated (fresh fruit), treatment of the pest population over multiple years may be required. Most organophosphates, such as Diazinon, Orthene or Lorsban, give little or no control for Sparganothis fruitworm. The insect appears to be completely resistant to the old chemistries.

Insect Growth Regulators (IGR's) (Intrepid and Confirm)

Growth regulators are caterpillar-specific and conserve natural enemies and pollinators. Conservation of the abundant wasps and flies that seek out and attack the pest larvae is a critical component of the best Sparganothis management programs.

These compounds need to be eaten to work. Once eaten by the caterpillar, the active compounds work by interfering with the insect's hormones and force the caterpillar into a "lethal molt." These compounds are most effective when applied multiple times and in low gallonage against small caterpillars feeding on foliage. Intrepid exhibits a higher activity level and longer residual than Confirm and gives better insect control as a result. However, it does leach through the soil and into the groundwater, putting it on the Groundwater Protection List. It can not be applied to cranberry beds within a primary recharge area for a public water supply (Zone II or IWPA).

Coverage and well-timed chemigation systems are critical for good efficacy (6 minutes or less rinse time); excessive chemigation washout will remove active material. A spray adjuvant should be used. 6 hours drying time following application is required. New vine growth is not protected. Larval death may not be observed until a week or more has passed.

INTREPID 2F – methoxyfenozide – Higher Activity Growth Regulator

—***No Zone II area applications allowed***
—16 oz applications, 64 oz maximum/season
— Multiple applications are essential, retreat after 14 days
—In spring, sweep to detect small larvae and treat ASAP
—Must ***target small*** caterpillars
—4 hour REI, 14 day PHI
—Use spreader/binder

CONFIRM 2F – tebufenozide – Growth Regulator

—Rules are the same as above for Intrepid but retreat sooner, after 7-10 days, residual not as long
—16 oz applications, 64 oz maximum/season
—4 hour REI, 30 day PHI

Application (Intrepid or Confirm): Ground, aerial, or chemigation is allowed. When chemigating, a minimum washout and a minimum volume of water should be used to avoid dilution. The full rate of 16 oz/A is always recommended. 6 hours of drying time are needed. A spreader sticker should be added for best coverage and retention.

Diamide-based Compounds (Altacor)

Altacor is the first insecticide registered in the diamide class of chemistry, and provides a new mode of action compared to all other classes of insecticides. This compound causes paralysis of the insect by sustained contraction of the muscles. It is an excellent fit in IPM programs in that it is a selective insecticide with low toxicity to beneficial arthropods, most importantly pollinators. In addition to exhibiting excellent activity against our key lepidopteran pests (i.e., cranberry fruitworm and Sparganothis fruitworm), it also has long residual activity and is safe to key mite predators. A good chemigation system, under 6 minutes, is desired for good efficacy. Ground applications using at least 30 gallons of water per acre, and preferably between 100-150 gallons per acre, may be the most effective applications. Target eggs and tiny larvae only, this compound will not manage larger caterpillars effectively.

ALTACOR – chlorantraniliprole

— 3-4.5 oz applications, 9 oz maximum/season	—Must ***target small*** caterpillars
— Water Dispersible Granules—Use spreader/binder	—4 hour REI, 1 day PHI
—. 3-4.5 oz/A, 9 oz maximum/season	—bee safe!

Application: Ground, aerial, or chemigation is allowed.

Spinosyn-based Compounds (Delegate, Entrust)

Spinosad-based products are fast acting nerve poisons but are still reduced-risk compounds. These compounds are a better choice (compared to Intrepid or Altacor) once the caterpillars have reached a larger size. Keep in mind that spinosyn products can be toxic to natural enemies, aquatic invertebrates and are **highly** toxic to bees. Sprays made over bees when they are actively foraging must be avoided (this includes Entrust, even though it is an organic formulation!). However, dried residues are essentially non-toxic. If treating during bloom, be sure that overnight conditions are such that evening chemigation applications will dry by morning.

DELEGATE – spinetoram

—longer lived residual	—3-6 oz applications, 19.5 oz maximum/season
—fast knock down effect	—4 hour REI, 21 day PHI
—beware bee toxicity	—7 day between spray interval

ENTRUST – spinosad OMRI Listed

— organic formulation	—2 formulations, check rates
—4 hour REI, 21 day PHI	—fast acting but short-lived residual
—beware bee toxicity	—7 day between spray interval

Application (Delegate or Entrust): Ground, aerial, or chemigation is allowed.

Pheromone traps. Traps should be used for best timing management of *Sparganothis* fruitworm and should be up by June 1. Use 1 trap/10 acres. Place on upwind side of bog. Check and clean traps weekly, recording number of moths captured. Change bait every 3 weeks. Check descriptions of adult moths in extension materials because non-target species are sometimes caught.

Timing for Delegate is 10-14 days after **peak** moth captures, ca. mid-to-late July. Intrepid, Confirm, and Altacor sprays need to go on several weeks earlier than conventional insecticide sprays (such as Delegate).

* In June/July, use pheromone traps to time application 3 weeks after **ONSET** of flight!
* "Onset" (=biofix) of flight means that once the trap is deployed (very early in June), several moths are captured in a single night. This means that traps need to be put out and then checked every day until biofix!
* This timing is usually end of June, beginning of July (NOT mid-late July like in the past!)